

CLAIMS LISTING

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A photothermal actuator comprising:  
an optical fiber bundle that is inserted in a tube;  
a light inputting apparatus that inputs light into said optical fiber bundle; and  
a thermal receiving element that is provided on a part of an outer surface of said optical fiber bundle,  
said thermal receiving element being heated by said light so that said thermal receiving element and a part of said optical fiber bundle are stretched, whereby said optical fiber bundle and said tube are bent;  
wherein said thermal receiving element is provided on an end portion of said optical fiber bundle; and  
wherein said end portion is cut at an incline to the axis of said optical fiber bundle.

2-6. (Canceled)

7. (Original) An actuator according to claim 1, wherein said thermal receiving element covers a wedge shaped area of an end portion of said optical fiber bundle.

8. (Currently Amended) A guide wire having a photothermal actuator, said photothermal actuator comprising:

an optical fiber bundle that is inserted in a tube;

a light inputting apparatus that inputs light into said optical fiber bundle; and

a thermal receiving element that is provided on a part of an outer surface of said optical fiber bundle,

said thermal receiving element being heated by said light so that said thermal receiving element and a part of said optical fiber bundle are stretched, whereby said optical fiber bundle and said tube are bent;

wherein said thermal receiving element is provided on an end portion of said optical fiber bundle; and

wherein said end portion is cut at an incline to the axis of said optical fiber bundle.

9. (Currently Amended) A guide wire having a tube and some photothermal actuators, each photothermal actuator comprising:

an optical fiber bundle in which light is inputted by a light inputting apparatus, said optical fiber bundle being inserted in said tube; and

a thermal receiving element that is provided on a part of an outer surface of said optical fiber bundle,

said thermal receiving element being heated by said light so that said thermal receiving element and a part of said optical fiber bundle are stretched, whereby said optical fiber bundle and said tube are bent;

wherein said thermal receiving element is provided on an end portion of said optical fiber bundle; and

wherein said end portion is cut at an incline to the axis of said optical fiber bundle.

10. (Original) A guide wire according to claim 9, wherein said optical fiber bundles are arranged in a concentric circle in said tube at even intervals.

11. (Original) A guide wire according to claim 9, wherein said optical fiber bundles are formed into a group of optical fiber bundles, said optical fibers bundles in said group adjoining each other.

12. (Original) A guide wire according to claim 11, wherein said guide wire comprises a plurality of said groups, and said groups are arranged in a concentric circle in said tube at even intervals.

13. (Currently Amended) A catheter having a photothermal actuator, said photothermal actuator comprising:

an optical fiber bundle that is inserted in a tube;

a light inputting apparatus that inputs light into said optical fiber bundle; and

a thermal receiving element that is provided on a part of an outer surface of said optical fiber bundle,

said thermal receiving element being heated by said light so that said thermal receiving element and a part of said optical fiber bundle are stretched, whereby said optical fiber bundle and said tube are bent;

wherein said thermal receiving element is provided on an end portion of said optical fiber bundle; and

wherein said end portion is cut at an incline to the axis of said optical fiber bundle.

14. (Currently Amended) A catheter having a tube and some photothermal actuators, each photothermal actuator comprising:

an optical fiber bundle in which light is inputted by a light inputting apparatus, said optical fiber bundle being inserted in said tube; and

a thermal receiving element that is provided on a part of an outer surface of said optical fiber bundle,

said thermal receiving element being heated by said light so that said thermal receiving element and a part of said optical fiber bundle are stretched, whereby said optical fiber bundle and said tube are bent;

wherein said thermal receiving element is provided on an end portion of said optical fiber bundle; and

wherein said end portion is cut at an incline to the axis of said optical fiber bundle.

15. (Original) A catheter according to claim 14, wherein said optical fiber bundles are arranged in a concentric circle in said tube at even intervals.

16. (Original) A catheter according to claim 14, wherein said optical fiber bundles are formed into a group of optical fiber bundles, said optical fibers bundles in said group adjoining each other.

17. (Original) A catheter according to claim 16, wherein said guide wire comprises a plurality of said groups, and said groups are arranged in a concentric circle in said tube at even intervals.

18. (Currently Amended) An endoscope having a photothermal actuator, said photothermal actuator comprising:

an optical fiber bundle that is inserted in a tube;

a light inputting apparatus that inputs light into said optical fiber bundle; and

a thermal receiving element that is provided on a part of an outer surface of said optical fiber bundle,

said thermal receiving element being heated by said light so that said thermal receiving element and a part of said optical fiber bundle are stretched, whereby said optical fiber bundle and said tube are bent;

wherein said thermal receiving element is provided on an end portion of said optical fiber bundle; and

wherein said end portion is cut at an incline to the axis of said optical fiber bundle.

19. (Currently Amended) An endoscope having a tube and some photothermal actuators, each photothermal actuator comprising:

an optical fiber bundle in which light is inputted by a light inputting apparatus, said optical fiber bundle being inserted in said tube; and

a thermal receiving element that is provided on a part of an outer surface of said optical fiber bundle,

said thermal receiving element being heated by said light so that said thermal receiving element and a part of said optical fiber bundle are stretched, whereby said optical fiber bundle and said tube are bent;

wherein said thermal receiving element is provided on an end portion of said optical fiber bundle; and

wherein said end portion is cut at an incline to the axis of said optical fiber bundle.

20. (Original) An endoscope according to claim 19, wherein said optical fiber bundles are arranged in a concentric circle in said tube at even intervals.

21. (Original) An endoscope according to claim 19, wherein said optical fiber bundles are formed into a group of optical fiber bundles, said optical fibers bundles in said group adjoining each other.

22. (Original) An endoscope according to claim 21, wherein said endoscope comprises a plurality of said groups, and said groups are arranged in a concentric circle in said tube at even intervals.

23. (New) A photothermal actuator comprising:  
an optical fiber bundle that is inserted in a tube;  
a light inputting apparatus that inputs light into said optical fiber bundle; and

a thermal receiving element that is provided on a part of an outer surface of said optical fiber bundle,

said thermal receiving element being heated by said light so that said thermal receiving element and a part of said optical fiber bundle are stretched, whereby said optical fiber bundle and said tube are bent, and

wherein said thermal receiving element covers a wedge shaped area of an end portion of said optical fiber bundle.

24. (New) A guide wire having a photothermal actuator, said photothermal actuator comprising:

an optical fiber bundle that is inserted in a tube;

a light inputting apparatus that inputs light into said optical fiber bundle; and

a thermal receiving element that is provided on a part of an outer surface of said optical fiber bundle,

said thermal receiving element being heated by said light so that said thermal receiving element and a part of said optical fiber bundle are stretched, whereby said optical fiber bundle and said tube are bent, and

wherein said thermal receiving element covers a wedge shaped area of an end portion of said optical fiber bundle.

25. (New) A guide wire having a tube and some photothermal actuators, each photothermal actuator comprising:

an optical fiber bundle in which light is inputted by a light inputting apparatus, said optical fiber bundle being inserted in said tube; and

a thermal receiving element that is provided on a part of an outer surface of said optical fiber bundle,

said thermal receiving element being heated by said light so that said thermal receiving element and a part of said optical fiber bundle are stretched, whereby said optical fiber bundle and said tube are bent, and



wherein said thermal receiving element covers a wedge shaped area of an end portion of said optical fiber bundle.

26. (New) A guide wire according to claim 25, wherein said optical fiber bundles are arranged in a concentric circle in said tube at even intervals.

27. (New) A guide wire according to claim 25, wherein said optical fiber bundles are formed into a group of optical fiber bundles, said optical fibers bundles in said group adjoining each other.

28. (New) A guide wire according to claim 27, wherein said guide wire comprises a plurality of said groups, and said groups are arranged in a concentric circle in said tube at even intervals.

29. (New) A catheter having a photothermal actuator, said photothermal actuator comprising:

an optical fiber bundle that is inserted in a tube;

a light inputting apparatus that inputs light into said optical fiber bundle; and

a thermal receiving element that is provided on a part of an outer surface of said optical fiber bundle,

said thermal receiving element being heated by said light so that said thermal receiving element and a part of said optical fiber bundle are stretched, whereby said optical fiber bundle and said tube are bent, and

wherein said thermal receiving element covers a wedge shaped area of an end portion of said optical fiber bundle.

30. (New) A catheter having a tube and some photothermal actuators, each photothermal actuator comprising:

an optical fiber bundle in which light is inputted by a light inputting apparatus, said optical fiber bundle being inserted in said tube; and

a thermal receiving element that is provided on a part of an outer surface of said optical fiber bundle,

said thermal receiving element being heated by said light so that said thermal receiving element and a part of said optical fiber bundle are stretched, whereby said optical fiber bundle and said tube are bent, and

wherein said thermal receiving element covers a wedge shaped area of an end portion of said optical fiber bundle.

31. (New) A catheter according to claim 30, wherein said optical fiber bundles are arranged in a concentric circle in said tube at even intervals.

32. (New) A catheter according to claim 30, wherein said optical fiber bundles are formed into a group of optical fiber bundles, said optical fibers bundles in said group adjoining each other.

33. (New) A catheter according to claim 32, wherein said guide wire comprises a plurality of said groups, and said groups are arranged in a concentric circle in said tube at even intervals.

34. (New) An endoscope having a photothermal actuator, said photothermal actuator comprising:

an optical fiber bundle that is inserted in a tube;

a light inputting apparatus that inputs light into said optical fiber bundle; and

a thermal receiving element that is provided on a part of an outer surface of said optical fiber bundle,

said thermal receiving element being heated by said light so that said thermal receiving element and a part of said optical fiber bundle are stretched, whereby said optical fiber bundle and said tube are bent, and

wherein said thermal receiving element covers a wedge shaped area of an end portion of said optical fiber bundle.

35. (New) An endoscope having a tube and some photothermal actuators, each photothermal actuator comprising:

an optical fiber bundle in which light is inputted by a light inputting apparatus, said optical fiber bundle being inserted in said tube; and

a thermal receiving element that is provided on a part of an outer surface of said optical fiber bundle,

said thermal receiving element being heated by said light so that said thermal receiving element and a part of said optical fiber bundle are stretched, whereby said optical fiber bundle and said tube are bent, and

wherein said thermal receiving element covers a wedge shaped area of an end portion of said optical fiber bundle.

36. (New) An endoscope according to claim 35, wherein said optical fiber bundles are arranged in a concentric circle in said tube at even intervals.

37. (New) An endoscope according to claim 35, wherein said optical fiber bundles are formed into a group of optical fiber bundles, said optical fibers bundles in said group adjoining each other.

38. (New) An endoscope according to claim 37, wherein said endoscope comprises a plurality of said groups, and said groups are arranged in a concentric circle in said tube at even intervals.